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NATIONAL INSTITUTE OF JUSTICE CENTER REQUIREMENTS DEFINITION, TECHNICAL ASSISTANCE, AGILE TEST AND EVALUATION AND CYBER SCIENCE ANALYSIS

L-3 Communications Government Services, Incorporated

AIR FORCE RESEARCH LABORATORY
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ROME, NEW YORK

STINFO FINAL REPORT

This report has been reviewed by the Air Force Research Laboratory, Information Directorate, Public Affairs Office (IFOIPA) and is releasable to the National Technical Information Service (NTIS). At NTIS it will be releasable to the general public, including foreign nations.

AFRL-IF-RS-TR-2003-296 has been reviewed and is approved for publication.

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13. ABSTRACT ***(Maximum 200 Words)***

This task provided for assembly, definition, and completion of technical enhancements in coordination with the National Law Enforcement and Corrections Technology Center -Northeast Region (NLECTC-NE). It also provided for Test and Evaluation (T&E) for the Advanced Generation of Interoperability for Law Enforcement (AGILE) and for analysis and assessment in cyber science including computer forensics. The mission of the NLECTC-NE in conjunction with the Air Force Research Laboratory/Information Directorate (AFRL/IF), is to facilitate the identification, development, and adoption of new products and technologies specifically designed for law enforcement, corrections, and other criminal justice applications. The current technology thrust areas for the NLECTC-NE are Concealed Weapons Detection (CWD), Secure Communications, Communications Interoperability, Timeline Analysis, Computer Forensics, Audio/Video Processing, Information Management, Automatic Speaker Recognition, Automatic Language Translation and Facial Recognition. This report outlines the major accomplishments of the task and identifies on-going technology efforts. These accomplishments include outreach activities, scientific and engineering assistance, AGILE development and technology demonstration activities, cyber crime initiatives, and Integrated Border Enforcement Teams (IBET) technology support.

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1. BACKGROUND

The mission of the National Law Enforcement and Corrections Technology Center–Northeast (NLECTC-NE) Region, in conjunction with the Air Force Research Laboratory/Information Directorate (AFRL/IF), is to facilitate the identification, development, and adoption of new products and technologies specifically designed for law enforcement, corrections, and other criminal justice and public safety applications. The current technology thrust areas for the Northeast Region are Concealed Weapons Detection, Secure Communications, Communications Interoperability, Timeline Analysis, Computer Forensics, Audio/Video Processing, Information Management, Automatic Speaker Recognition, Automatic Language Translation and Facial Recognition.

The NLECTC-NE Center is located in Central New York at the Air Force Research Laboratory/Information Directorate (AFRL/IF) in Rome, NY. L-3 Communications Government Services, Inc. (L-3 GSI) and Dolphin Technology, Inc., support the management of the Center under AFRL contract. The team consists of L-3 GSI and Dolphin personnel and will henceforth be referred to as the L-3 GSI team. This report outlines the major accomplishments of the NLECTC-NE under the L-3 Communications Government Services, Inc., Task Ordering Contract (TOC), Task 21. Activities of the L-3 GSI Team described in this report are divided into five sections: outreach activities, scientific and engineering assistance activities, and three special projects: interoperability (the AGILE project), cybercrime, and border enforcement technologies.

2. OUTREACH ACTIVITIES

Part of the mission of the Center is to provide information on evolving technologies for public safety, and to publicize the activities and the services of the NLECTC system to the state and local law enforcement and corrections community. This is accomplished by presentations at key conferences and meetings, by conducting demonstrations of technologies at Tech Fairs, and by working with an advisory council.

2.1 Presentations, Conferences and Symposia

The L-3 GSI team conducted a number of outreach activities including presentations and attendance at regional and national law enforcement and corrections conferences and seminars. The following is a list of the conferences and meetings supported:

DATE	CONFERENCE	LOCATION
May 2002	Public Safety Conference	Albuquerque, NM
August 2002	Homeland Security Conference	Philadelphia, PA
August 2002	Critical Infrastructure Conference	Washington, DC
October 2002	HTCIA International Training Conference	Atlantic City, NJ
February 2003	CCIPS Mock Court Trial on Digital Evidence	Williamsburg, VA
April 2003	Homeland Security Conference	Orlando, FL
May 2003	Conference on Critical Infrastructure Protection	Arlington, VA

2.2 TECHNOLOGY DEMONSTRATIONS

The L-3 GSI team was actively involved in demonstrating new technologies as part of the outreach to the law enforcement, corrections, and public safety community. The following is a list of the events in which the L-3 GSI team conducted technology demonstrations:

DATE	CONFERENCE	LOCATION
October 2002	HTCIA International Training	Atlantic City, NJ
April 2003	Tech Fair in conjunction with the Regional Advisory Council meeting	Philadelphia, PA

2.3 NLECTC-NE ADVISORY COUNCIL

The NLECTC-NE Advisory Council is composed of law enforcement and corrections practitioners from each of the sixteen states in the Northeast region. Their mission is to provide prioritization of requirements, address state and local issues, and to support interfaces with the law enforcement and corrections community within each state. The Council meets semi-annually within the various states in the Northeast region and the L-3 GSI team fully supports each meeting, including the planning and coordinating of sites, agendas, travel arrangements and guest speakers.

Regional Advisory Council Meetings were held in Rome, NY on 04-05 November 2002, and in Philadelphia, PA on 30 April - 01 May 2003.

3. SCIENTIFIC AND ENGINEERING ASSISTANCE

3.1 TECHNOLOGY ASSISTANCE EFFORTS

Scientific and engineering assistance was provided to several public safety agencies in the general area of communication and information technology. Assistance ranged from simple responses to questions, to more detailed studies, analyses, and on-site visits. Activities that required analysis and/or site visits were conducted on behalf of the following agencies:

- *New York City (NY)*—Provided assistance to the Fire Department of New York in evaluating a concept for a system to allow first responder personnel to enter information from handheld sensors, automatically assign a location to the data, and transmit the data to a field command site. Technology alternatives for the wireless communication system and the accompanying GIS mapping system were provided.
- *Methuen (MA)*—Completed the final assessment of the information technology needs of the public safety agencies in Methuen.
- *Utica (NY)*—Reviewed and updated the Utica Police Department Mobile Data Report to reflect the recent research covering 802.11a/802.11b technologies and Bluetooth.
- *Madison County (NY)*—Completed the analysis of the Madison County radio system. Briefed the Sheriff, Undersheriff and E911 Director of Madison County on the draft recommendations for their land mobile radio system. It is recommended the County pursue a strategy of incremental

improvements for their current system while the New York State Wireless Network is being deployed, and vigorously pursue information from the state that would allow them to assess the costs and benefits of subscribing to that system. A roadmap was provided for near-term fixes intended to improve system performance. The final recommendations were documented in a report delivered to Madison County.

- *West Chester (PA)*—Reviewed background materials related to West Chester Police Department's (WCPD) communication system, and provided assistance in developing a procurement strategy for a new system. A draft RFI was completed and forwarded to WCPD to be sent out to potential radio system vendors to identify appropriate technologies and products. WCPD used the RFI to collect information from vendors prior to making their final decision on the radio system upgrade.
- *Syracuse (NY)*—Assisted the Syracuse Police Department in designing a mobile data capability. Identified products such as Cisco wireless LAN access points and the security product marketed by Fortress Technologies; these products were eventually procured and installed by SPD. Fortress has provided on-site technical assistance to SPD as a "test case" for use of this product by the public safety market.
- *Chittenango (NY)*—Conducted a propagation model analysis of the proposed repeater site for Chittenango Police Department. County Board Members were briefed on the final recommendation.
- *Prince George County (VA)*—Conducted a propagation model analysis of the proposed tower sites for Prince George County, VA Police Department. The results were documented in a technical memorandum.
- *Chowan County (NC)*—Conducted a propagation model analysis for the proposed tower sites for Chowan County, NC Sheriff's Office. The results were documented in a technical memorandum.
- *Buffalo (NY)*—Prepared and delivered a communication survey as part of a technical assistance effort for the New York State Park Police in Buffalo, NY. The Park Police completed the survey, which provided information on current radio systems capabilities and issues that needed to be analyzed.
- *Rockland County (NY)*—Attended an initial meeting with Rockland County, NY. Communication issues were discussed and the Rockland County Communications van was viewed. A follow up site visit with an AGILE interoperability presentation was then made. Radio communication issues were discussed with propagation studies pending additional data from the Orangeburg Police Department.
- *Sturbridge (MA)*—Conducted a site visit and began writing a tower site propagation modeling report for Sturbridge, MA Police Department.
- *SUNY Morrisville (NY)*—Analyzed issues with the SUNY Morrisville Police Department's communication system, as well as the impact of moving all student communications to Nextel Wireless.
- *Brookfield (NY)*—Conducted propagation modeling for the Brookfield Highway Department.
- *Vermont*—Conducted an assessment of information technology needs of the Vermont Department of Corrections.

3.2 Other Scientific And Engineering Assistance Efforts

General technical support to the NLECTC-NE has been provided, including compilation of reports for the National Institute of Justice (NIJ), conference and meeting coordination, maintenance of

the Northeast website, and grant assistance. There were 480 requests for information received by the NLECTC-NE. These included Commercialization Assistance, Equipment Acquisition Assistance, Requests for Information & Publications Assistance, Standards and Testing, Technology Assistance (SEAS), Technology Demonstrations/Introductions, and Training Assistance (Capacity Building).

3.3 Operational Evaluation

Technical support was provided to the New York State (NYS) Department of Correctional Services (DoCS) Product Evaluation Committee (PEC). The PEC evaluates new products to be procured by the NYS DoCS system or facilities. Information coordination was provided for the PEC by tracking product evaluations in other states to facilitate information exchange and provide technical advice on products under evaluation.

One of the major evaluations conducted by the NYSDoCS PEC involved X-ray baggage screening equipment. NLECTC-NE provided technical assistance in developing the test methodology, data collection tools and results analysis. The evaluation included one week of training by equipment manufacturers and three weeks of testing where over 1000 scans were evaluated in detail. NLECTC-NE has participated in presenting the technology evaluation information at several forums including the RAC, NTPAC and the ACA. NLECTC-NE is coordinating with NYSDoCS PEC in the publication of a formal technology evaluation report.

Based on participation with the NYSDoCS PEC, the L-3 GSI team helped facilitate the creation of an eleven state regional product evaluation organization called the Northeast Technology and Product Assessment Committee (NTPAC). L-3 GSI provided technical support and participated in their quarterly meetings.

3.4 Capacity Building

The L-3 GSI team participated in a number of events that were intended to enhance the ability of law enforcement and corrections agencies to apply new technologies to address their requirements. The Team supported the following activities:

- Discussions were held with the Utica Police Department (UPD) regarding the handling of digital evidence. Technical guidance was provided regarding the purchase of appropriate hardware and software, as well as training. Facilitated training of law enforcement officers in electronic crime scene awareness. The training was hosted by the UPD and was attended by 140 law enforcement officers from eleven agencies. Information presented included understanding computer crime, search and seizure, subpoenas, search warrants, laws, and electronic devices.

3.5 1033 Program Support

Assistance with the 1033 Federal Surplus Property Program was provided to the following agencies:

Ithaca, NY Police Department

New York City Department of Environmental Protection Police

Franklin Township, NJ Police Department

Waltham, MA Police Department

Suburban Middlesex County Drug Task Force

Rochester, NY Police Department

Olympia Fields, IL Police Department

West Brookfield, MA Police Department

Central New York Police Academy

Massachusetts State Coordinator's Office

Madison County, NY Sheriff's Office

Monroe County, NY Sheriff's Office

U.S. Government Printing Office

3.6 School Security

The L-3 GSI team continued to work with the New York Police Department School Safety Division in following up the concealed weapons detection operational evaluation conducted in 2000.

NLECTC-NE sponsored five school safety resource officers from five states in the northeast to attend the NLECTC-Southeast School Safety Technology Workshop in Raleigh, NC.

3.7 Concealed Weapons Detection

A GUI database to facilitate the capturing of test bed data in real time to support the NYC test bed was developed. This database was modified for a more generic use and is being made available as a tool for all law enforcement and correctional agencies seeking tools to assist them in operational testing and evaluation. It was tested during the recent X-ray evaluation with New York State Department of Corrections.

The L-3 GSI team also received and responded to a request from TestTex Inc. to review an emerging CWD metal detector technology. TestTex is currently exploring the CWD market potential for commercializing a new innovative sensor approach to a portal detection system.

4. ADVANCED GENERATION INTEROPERABILITY FOR LAW ENFORCEMENT

The Advanced Generation of Interoperability for Law Enforcement (AGILE) program is a major commitment by the National Institute of Justice (NIJ) to address the issues of interoperability that hampers effective and efficient cooperation among multiple law enforcement and other public safety agencies. Interoperability issues appear in various ways: communications systems which cannot support inter-agency communications, information that is not accessible by all agencies who need it, and open case and suspect information maintained by one agency that is unknown by other agencies working on related cases. The AGILE program is a broad-based set of activities to address the varied aspects of the interoperability challenge, organized into three major thrust areas:

- Research, development, test, and evaluation (RDT&E);
- Standards identification, development, and adoption; and
- Outreach and technical assistance.

A key component of the AGILE RDT&E thrust area is an Operational Test Bed (OTB) in a public safety environment to integrate, test, and evaluate technologies that can contribute to addressing interoperability needs. For the OTB, candidate technology solutions to specific interoperability requirements are categorized and evaluated to address key issues of voice over-the-air interoperability, data transmission interoperability, data sharing, and data analysis. The evaluations include quantitative performance measurements as well as qualitative evaluations of the impact of the technology on law enforcement agency operations.

4.1 OPERATIONAL TEST BED—ALEXANDRIA

The Operational Test Bed—Alexandria (OTB-A), is an operational evaluation of an ACU-1000 Intelligent Interconnect unit for linking together disparate radio communications systems. The initial testbed included the U.S. Park Police, Washington Metropolitan Area Transit Authority Police, and the Metropolitan (DC) Police Department as partners with the Alexandria Virginia Police Department in evaluating the ACU-1000 in an operational setting.

After the events of September 11, 2001, the Communications Subcommittees of the Washington Council of Governments (COG) met to develop a plan to address the interoperability shortfalls that were

apparent in the response to the attack on the Pentagon. The COG identified the successful implementation of the Gateway System in Alexandria as a model for systems in the area. As a first step, the L-3 GSI team procured and installed additional equipment for the system in Alexandria to expand from the original six radio interfaces to a total of eighteen radio interfaces. The expanded system is shown in Figure 1. The expanded Gateway became part of the Metropolitan Interoperable Radio System (MIRS), which include additional sites established in the metropolitan Washington area and modeled after the expanded Alexandria site.

Figure 1. Expanded Gateway System

In addition to expansion of the number of radio interfaces in the gateway, several other enhancements were made to the Gateway Subsystem. Alexandria Police Department (APD) staff installed a new monitor for the Gateway Subsystem in the Communications Center. The radios and the radio/ACU-1000 interconnect cables were installed by APD's radio shop contractor. Personnel programmed the APD UHF frequencies into the existing radios and built new programming templates for the new Motorola W-5 and MCS-2000 radios. Two tripod mounts for transient antennas were ordered, which were installed at APD. The L-3 GSI team put together a technical memorandum explaining technical information on the antenna mounts to assist in getting approval from the city's building management. The L-3 GSI team also installed and connected a JPS serial/Ethernet adapter (ETS-1) to provide enhanced control of ACU-1000 Intelligent Interconnect units installed at the operational test bed in Alexandria. Installation and connection of the ETS-1 provided the Alexandria Police Department with the capability of controlling the ACU's from any radio/E-911 dispatch control position.

The Gateway Subsystem, including the ACU-1000 interconnect switch, was used during the Independence Day celebration on the 4th of July. A link was requested for a detail working the park areas along the George Washington Parkway in Arlington, VA. The link was to establish a common communication channel between the U.S. Park Police, Prince William County Police Department and Arlington Police Department. Communications between each agency and the ACU-1000 was tested prior

to 04 July 2002. On 04 July 2002, the link was established around 1300 hours and was used operationally throughout the afternoon and evening hours. There was constant traffic over the net. The ACU-1000 interconnect performed very well with no communication problems among the agencies.

Interoperability support was also provided for Police Week activities in Washington, DC and Alexandria, VA on 12-16 May 2003. Radio communications were set up at the Hilton Hotel. Another Command Post was set up at the Fraternal Order of Police (FOP) headquarters in Washington, DC. Although their missions are different, these two Command Posts needed to communicate, so the Team set up a second base station at the DC Command Post. The communications link was widely used on the first night when two separate incidents sent four motorcycle officers to the hospital while escorting buses. In addition, parking for en-route buses was coordinated between the two Command Posts.

Based on the continuing successful use of the gateway at Alexandria, another candidate site was identified in Prince William, Virginia. Initial planning was undertaken for the Prince William site. The L-3 GSI team and Alexandria Police Department staff met with representatives of the Prince William County Police Department to begin discussions on a MIRS site to be located there.

Work continued on identifying and documenting licensing issues associated with fixed site gateways such as Alexandria. Additional analysis included a review of the NTIA red book for comparison to section of CFR 47, Part 90.

The operational evaluation was then extended to include a new technology for communications: Voice over Internet Protocol. Two NXU-2 devices were obtained on loan from JPS Communications to provide a Voice over IP (VoIP) interface to the ACU-1000. The NXU-2 devices were installed at the ACU-1000 in the APD Public Safety Building and an off-site office. The devices allow remote control of the ACU-1000 and remote audio interface with the device over the Alexandria city local area network (LAN) using VoIP technology. In order to avoid disrupting activity on the city's LAN, a DSL line was installed both sites, allowing the ACU-1000 to be accessed over the Internet for demonstration purposes.

Hardware and technical support was provided to the Montgomery County Task Force formed in response to the series of sniper shootings that occurred in the Metropolitan Washington area. The L-3 GSI team worked with Knowledge Concepts Corporation (KCC) and the Tucson, Arizona Police Department to identify the server configurations necessary for hosting the CopLink software developed by KCC researchers (and originally tested by the Tucson PD) at the Montgomery Co. Task Force. A 2600 PowerEdge server was procured and delivered to the Task Force headquarters. A second larger server was ordered to accommodate the rapidly increasing volume of information as the investigation continued. Additionally, on 24-25 October 2002, direct technical support was provided to the Montgomery County Task Force with computer data analysis. More than 100 different databases were being analyzed for leads. Major databases included the thousands of tips that were coming into the FBI's Rapid Start database. Vehicle data from DMV and vehicle stop data from NLETS were also analyzed. Smaller databases included Department of Corrections work release files.

The following document was generated describing the activities and results of the activities associated with the Expanded Gateway Subsystem:

- *Expanded Gateway Subsystem Description Document, AGILE Report No. TE-02-03.*

4.2 CAPWIN SUPPORT

Part of the AGILE effort included support of the Capital Wireless Information Network (CapWIN) project. The goal of CapWIN is to deploy a wireless information infrastructure in the metropolitan Washington (DC) area to support transportation and public safety information exchange requirements.

The L-3 GSI team assisted in the definition of requirements for CapWIN by developing user case scenarios by conducting lengthy interviews with various police, fire and DOT personnel. The interviews centered on public safety response to a range of incidents. Individual roles and data communications needs were documented. This information was then incorporated into requirements documentation for CapWIN.

Reports were designed for the CapWIN network, beginning with the Incident Report. The report was designed to be scalable so that the same report can be used to generate a short three lines of information describing the main components of the incidents, or a very detailed report showing the log of all responding units, as well as the transcripts of the chat room(s) and email(s) associated with the incident, depending on user parameters set when the report is run.

The CapWIN implementation contract was awarded to IBM. The IBM solution will use open architecture MQSeries Integrator and Websphere. Templar will provide their Informant and Ikimbo will provide Omniprise real-time communications. Staff supporting the CapWIN effort met with the IBM Program Manager and participated in a number of meetings to discuss the standards that will be used on the project.

Possible application of VoIP technology for CapWIN was investigated. One application is using the mobile data computers in the vehicles to communication (via voice) under certain circumstances (task forces, stakeouts) with one another over the network. The second application is use of the Catalyst VoIP radio gateways in each of the jurisdictions in the region interfaced to the CapWIN Global Directory.

The activities of the Council of Government's PAWN committee, as an example of interagency information sharing, was also supported by the L-3 GSI team. This group defined the specification for a system to be developed. A system architecture was developed based on the Minneapolis Pawn system, but with capabilities to run a local version on a standalone PC as required. The COG hired a consultant, MitreTek, to conduct a needs assessment for the regional Pawn system. The L-3 GSI team worked with MitreTek to review the results of the survey that was handed out to pawn shops and all the COG police agencies to identify what systems might be in place, what staffing level exists, what individual needs and/or requirements each might have, as well as data for tracking information from pawn shops.

4.3 MULTI-BAND ANTENNA EVALUATIONS

The L-3 GSI team worked with the Institute of Telecommunications Science (ITS) for a laboratory test of a multiband antenna (shown in Figure 2) developed by Mission Research Corporation (MRC) under a research and development project funded by NIJ. In order to compare the prototype antenna with other products in the market, a tri-band whip antenna (Tri-une) for testing and a reference single band whip antenna were purchased. A detailed evaluation plan and a list of the technical issues to be addressed during laboratory and operational testing were developed.

Figure 2. Multi-Band Antenna

The L-3 GSI team also worked with the Office of Law Enforcement Technology Commercialization (OLETC) in preparation for deploying the antennas for operational evaluation. The Kentucky State Police (KSP) was contacted; KSP had received an antenna from MRC and had started working with it and was able to provided several observations. KPS agreed to participate as an evaluator in the operational evaluation.

ITS conducted the laboratory testing of the antenna and concluded that it did not perform as well as the commercial whip antenna. The inputs from the Kentucky State Police concerning performance in the field corroborated the data from the laboratory tests. Since the prototype antenna did not perform as well as commercial solutions, no further operational evaluation was conducted.

4.4 INTEROPERABILITY PRODUCT EVALUATION

Information was compiled on a number of different interoperability products. One product was the Incident Commander's Radio Interface (ICRI), depicted in Figure 3. The ICRI provides crossband switching capability, much like the ACU-1000, is more portable with less functionality at a lower cost.

Figure 3. Incident Commander's Radio Interface

Because C-AT is a small company and had not geared up for large scale production, the L-3 GSI team began working with the Office of Law Enforcement Technology Commercialization (OLETC) to discuss plans for C-AT production management, and what assistance OLETC could offer C-AT to support commercialization. The L-3 GSI team met with C-AT to discuss plans for the Gen III version of the ICRI at C-AT's facility in Reston, VA. After reviewing their production plans, work commenced on a detailed evaluation of the ICRI device.

The L-3 GSI team worked with ITS to develop a test plan for laboratory evaluation of an ICRI, and purchased a unit from C-AT. The unit was shipped to ITS's facilities in Boulder, CO for testing.

Another area of interoperability products of interest was mobile interoperability systems. The L-3 GSI team collected information on products coming to market as mobile interoperability solutions, and obtained information from vendors. One product being reviewed by the South Carolina Law Enforcement Division was for a mobile interoperability capability based on a trailer containing an ACU-1000. The L-3 GSI team participated in that evaluation.

The results of the information collected on various interoperability products were compiled into a report entitled, "*A Guidebook for Interoperability Products and Strategies.*" The Guidebook categorized different interoperability approaches and also contained a listing of all interoperability products that were identified.

4.5 VOICE OVER IP

Analysis of various products and applications of Voice over IP (VoIP) technology for public safety began. The analysis began as a comparison of technology under development by E. F. Johnson and JPS, and is expanding to include other VoIP products.

A working paper was written describing various architectural approaches to using VoIP in a public safety radio communications network. The scope of the report increased from a contrast paper between the NXU-2 and the E.F. Johnson system to an overview of methods and applications for this technology, with industry examples. Additional sections were added on applications, internetworking technology, and IP addressing. The L-3 GSI team continued to develop operational evaluation plans. Differences between JPS's NXU devices and E.F. Johnson architectures precluded a simple "drop in" of the NXU hardware into the test environment being developed by ITS for the E.F. Johnson test.

A VoIP application (EchoLink) used by amateur radio operators was identified, and began looking at installing at L-3 for evaluation.

4.6 SECURE COMMUNICATIONS INTEROPERABILITY OPERATIONAL EVALUATION

The objective of this operational evaluation was to (a) demonstrate and evaluate use of ACU-1000 in situations that require secure communications; and (b) identify technical and operational requirements for interoperability among local, state, and federal agencies in situations that require secure communications. Under this activity, assistance was provided to the Syracuse Police Department (SPD) in configuring and deploying an ACU-1000, which SPD had purchased for both general incident management, as well as counter narcotic task force operations. The counter narcotics application requires that communications be encrypted. As an outgrowth of this activity, the SPD began to consider the possibility of using an ACU-1000 to link various city agencies.

The following document was generated describing the activities and results of the activities associated with the secure communications interoperability operational evaluation:

- *Secure Communications Interoperability Operational Evaluation Interim Report, AGILE Report No. TE-02-01.*

4.7 SOFTWARE DEFINED RADIO REQUIREMENTS ASSESSMENT

The L-3 GSI team worked to define public safety requirements for software defined radios, a new technology for building radio systems. Technical support was provided to the National Public Safety Telecommunications Council (NPSTC) Software Defined Radio Working Group and facilitated several meetings that led to the NPSTC membership in the SDR Forum. Comments were compiled and a Point Paper drafted for NPSTC concerning the SDR Forum's position on the Federal Communications Commission (FCC) Notice of Proposed Rule-Making on SDRs. Although the FCC had already issued the Report and Order, the Point Paper outlines the areas of alignment and differences between the SDR Forum's assumptions concerning public safety inputs and NPSTC's positions.

The L-3 GSI team began attending Software Defined Radio (SDR) Forum meetings, along with representatives of the NPSTC SDR Working Group. At the June 2002 SDR Forum meeting, NPSTC representatives gave a general overview of the public safety community and market in the opening session, and provided a more detailed discussion of public safety requirements in a joint session of the

Technical and Regulatory Committees. This was the first comprehensive presentation of public safety requirements to the SDR Forum from the practitioner's point of view. The L-3 GSI team, NIJ, and NPSTC Working Group representatives participated in several of the breakout sessions, including the Regulatory Committee, the Security and Architecture Working Group, the Terminal and Network Working Group, the Download Working Group, the System Interface Working Group, and the Research & Development Working Group.

The L-3 GSI team began working two new initiatives with the NPSTC SDR Working Group. The first initiative was definition and documentation of public safety requirements for software defined radios. As part of this initiative, scenarios of public safety activities were documented to be used as the basis for deriving communications requirements. The second initiative was to sponsor meetings with land mobile radio vendors who are currently, or have expressed interest in entering the public safety market. Several meetings in support of this initiative were coordinated, including a site visit to Motorola, a round table discussion with several land mobile radio manufacturers, and a Public Safety – Industry Workshop held in San Jose, CA in conjunction with an SDR Forum meeting,

APD staff and the L-3 GSI team also worked with SPAWAR to prepare for a demo of the Software Adaptive Advanced Computing (SAAC) Software Radio given at the U.S. Capitol.

4.8 JUSTICEXML PILOT

The L-3 GSI team worked with the Syracuse Police Department and the Onondaga County Sheriff's Department on a pilot project involving justiceXML, a standardized XML repository being developed for public safety information exchange. Syracuse PD became aware of a commercially available forms package that could meet their requirement for having officers enter incident, arrest, and other reports directly at their desktops or laptops rather than handwriting reports for subsequent data entry. The L-3 GSI team reviewed the initial capability and recommended that the departments move forward with their plan. The forms package had the capability of writing data out in XML, so it was further recommended that the project adopt justiceXML as the basis for the output, which was accomplished.

Continuing assistance was provided on the project, arranging for a seminar in Syracuse on justiceXML, and providing continuing technical guidance. In addition, the L-3 GSI team worked with other agencies in the region to investigate how use of a standard, justiceXML, could be used to facilitate interoperability and data sharing among agencies. A prototype was written to extract data from other existing records management systems to demonstrate how other departments such as the police departments in neighboring Oneida County could output data in the same justiceXML format, allowing queries to be written that could access multiple agency databases simultaneously.

4.9 INTEROPERABILITY ASSISTANCE

Assistance was provided to agencies specifically looking at interoperability issues. Among the projects are the following:

- *Syracuse, NY*—Provided interoperability assistance to the City of Syracuse. As part of the analysis of interoperability among city departments in the City of Syracuse, the L-3 GSI team compiled the information from surveys that were filled out by representatives of fifteen city departments. The survey information was entered into an Access database and analysis reports were generated showing shortfalls between interagency requirements and existing capabilities. The team met with Syracuse PD and Onondaga County personnel to discuss the Syracuse Citywide survey results and several options for an ACU-1000 pilot program between city agencies. The ACU-1000 was demonstrated for all Syracuse city agency department heads. Other agencies were identified for pilot projects (Police, Water, Aviation departments). The Syracuse Police Department provided site

location information for the radio repeater sites of the Departments of Aviation and Water. Propagation models were run to assess coverage.

- *Louisville-Jefferson County, KY*—Interoperability assistance was provided in analyzing communications operations for combining the Louisville Police Department and the Jefferson County Police Department. The challenge was to suggest a near-term, low cost approach to creating a combined communications capability from their existing VHF and UHF systems. The L-3 GSI team's activities included generation of rough propagation models for initial analysis; search of the FCC database on parameters of the current radio systems; review of a previous engineering report conducted in 1998 covering some relevant technical issues; and discussion with the Jefferson County Commonwealth's Attorney's Office. Based on the analysis, a tiered set of recommendations were provided, including purchase of an ACU-1000 as a short-term solution, some mid-term options, and replacement of both legacy systems with a new trunked radio system as a long-term option. The consolidated department began following the recommended course of action by purchasing an ACU-1000 and began pursuing funding options for a new system.

- *Rockland County, NY*—Assistance was provided to agencies in Rockland County, New York in defining interoperability requirements. Assistance included review of a number of documents compiled as Rockland County was investigating options to build a county-wide system, propagation studies for the existing 470 MHz system, and a site visit to discuss possible interoperability approaches.

- *Lake Jackson, TX*—Interoperability assistance was provided to law enforcement agencies in and around Lake Jackson, TX. Lake Jackson is a small town located 50 miles south of Houston with primary employers being Dow Chemical and BASF chemical plants. Union workers at the Dow Chemical plant alerted law enforcement agencies to the possibility of a strike. Strikes in the past have turned violent and presented a serous problem for law enforcement agencies. The ACU-1000 was installed, equipment familiarization for the unit provided, and information on configuration and set up of both the ETS-1 and DSP-1 given. No incidents were reported during the strike.

- *Val Verde County, TX*—The department has a requirement for a Records Management System (RMS) and has established a hardware base, but the application software company went out of business before completing and debugging the installation. The failed software package is about to be acquired and assistance was provided in reviewing the plan of the new company to complete installation of the application.

- *Charlotte, NC*—Interoperability assistance was provided to the City of Charlotte. Initial interoperability requirements were obtained by forwarding an interoperability questionnaire for agencies to fill out. A site visit to discuss interoperability options was also conducted.

- *Kansas Highway Patrol, KS*—Worked with a representative of the Kansas Highway Patrol (KHP) to discuss their operational evaluation project for a mobile data system that would use either cellular or satellite communications based on availability of service. KHP sent out a copy of their plan which was reviewed and comments provided.

- *Allegheny County, PA*—Assistance was provided to Allegheny County in looking at their interoperability needs. A site visit was conducted, and performed follow-up analysis regarding the frequencies used in public safety within the County. Location information was compiled to plot coverage from each PSAP if an ACU/radio gateway system were established at each PSAP, looking for advantages/disadvantages of each location. The propagation studies and analysis were documented.

- *Aventura, FL*—The L-3 GSI team and APD staff conducted a technology assessment visit in south Florida and met with representatives of the Police Departments of Aventura, Hollywood,

and Coral Gables. A site visit was conducted to the Aventura repeater and the Hollywood Police Department dispatch facility. Inputs on several interoperability issues were provided, the most immediate of which involved linking the three EDACS systems. It was recommended they execute their existing plan to address the problem. Additional information on commercial products was provided as requested by the Aventura Chief.

- *Sheriff's Association of Texas*—The user interface for the Radio Inventory Survey Tool was developed, which is being used by the Sheriff's Association of Texas to compile information about radio towers and equipment in the state. This inventory is needed as part of the planning process for an upgrade to the state's radio capabilities.

4.10 OUTREACH

A number of outreach activities were conducted including presentations and attendance at regional and national law enforcement and corrections conferences and seminars. The following is a list of the conferences and meetings supported:

DATE	CONFERENCE	LOCATION
May 2002	APCO Eastern Regional	Greensboro, NC
June 2002	SDR Forum Meeting	Boston, MA
August 2002	APCO General Meeting	Nashville, TN
October 2002	IACP	Minneapolis, MN
January 2003	SDR Forum Meeting	San Jose, CA
January 2003	Industry Public Safety Symposium	San Jose, CA
March 2003	International Symposium on Advanced Radio Technology	Boulder, CO
March 2003	Project North Star Eastern Regional Meeting	Syracuse, NY
May 2003	Cross Border Crime Forum	White Sulpher Springs, WV
May 2003	Force Protection Exhibition & Demonstration	Quantico, VA
June 2003	SDR Forum Meeting	Oak Brook, IL

A new version of the Interoperability Resource CD-ROM, containing a number of technical documents and videos developed by all members of the AGILE Project Team was developed and published.

The L-3 GSI team, APD, and NIJ staff worked with the Law Enforcement Television Network (LETN) and representatives of local agencies to videotape material for an LETN video on the testbed in Alexandria, VA. A mock bank robbery and a multi-agency pursuit was created and filmed. Taping took place over a three-day period. The ACU-1000 was used throughout the filming. The mock robbery was videotaped at the Burke and Herbert Bank on King Street in Old Town Alexandria, VA and captured the

vehicle pursuit down George Washington Parkway, with multiple agencies becoming involved in the chase and linked into the communications net. Final arrest scenes involving the four law enforcement partner agencies were also filmed.

4.11 INTEROPERABILITY DEMONSTRATIONS

Several interoperability demonstrations were provided to public safety agencies, universities, and vendors. Dates, locations and agencies are as follows:

DATE	ATTENDEES	LOCATION
18 May 2002	Waterford (CT) PD; Waterford (CT) FD; New London (CT) FD; East Lyme EMS; Tri-Town Emergency Management Office; FEMA; U.S. Submarine Base (Groton) Fire; Connecticut State Police; American Ambulane Services; CT State Department of Environmental Protection; Marine State Services (CT); East Lyme Town Highway Department; New London DPW; Waterford Town Highway Department	New London, CT
28 May 2002	House and Senate staffers/Appropriations Subcommittees	Washington DC
7 June 2002	Jefferson Co. (KY) Commonwealth Attorneys Office, U. of Louisville	Louisville, KY
14 June 2002	RCMP, USBP, USCS, NYSP	Lacolle, QC
24 June 2002	Maryland State Police	Alexandria, VA
18 July 2002	Maine State Police	Augusta, ME
22 July 2002	Allegheny County	Alexandria, VA
23 July 2002	LA County Sheriff	Alexandria, VA
6 August 2002	State of Florida LE Commission, Coral Gables PD, Hollywood PD, Aventura PD	Aventura, FL
27 August 2002	US Congress House Appropriations Committee Survey Staff	Washington DC
28 August 2002	Sydney Freeburg from The National Journal	Washington, DC
5 September 2002	Mecklenburg Co. Charlotte PD, Charlotte FD, Charlotte Fire Marshal, Medic Mecklenburgh Co.	Charlotte, NC

DATE	ATTENDEES	LOCATION
6 September 2002	NC State University, NC State Highway Patrol, Raleigh PD, Cary (NC) PD	Raleigh, NC
17 September 2002	Various Agencies	Alleghany Co., PA
27 September 2002	FEMA and Safecom Personnel	Alexandria, VA
2 October 2002	Border Patrol; US Customs; RCMP	Windsor, ON
7 January 2003	Asinshinabek First National, Canada Customs, Canada Immigration, Chippewa Co. E-911(ON), Chippewa Co. (ON) Prosecuting Atty. Canada Rail PD, Michigan State Police, Ontario Ministry of Natural Resources, Royal Canadian Mounted Police, SOO Michigan PD, SOO Ontario PD, Spectrum 2000, US Border Patrol, US Customs, US Immigration and Naturalization Service, US Coast Guard	Sault Ste Marie, MI
24 January 2003	Alexandria PD, State of Florida Law Enforcement Communications, Air National Guard Florida, RCC Consultants, Clay Co. (FL) Sheriffs, Alachua Co. (FL) Sheriffs, Bradford Co. (FL) Sheriffs	Jacksonville, FL
31 January 2003	US Coast Guard, Canadian National Rail Police, NPRS, Ohio Dept. of Natural Resources, US Attorney, US Customs, New York State Dept. of Motor Vehicles, New York State Park Police, Erie Co. (NY) Sheriff, US Border Patrol, Batavia PD, FBI, Amherst PD, New York State Police, Monroe Co. (NY) Radio Center	Buffalo, NY
13 February 2003	Calhoun County, MI E-911; Calhoun County Board of Commissioners; Calhoun County Sheriff's Department; Tekowsha, MI Fire Department; Village of Tekowsha; Battle Creek Fire Department; Battle Creek Emergency Services; Battle Creek Police Department; Pennfield Charter, MI Township; Bellevue, MI Fire Department, Athens, MI Fire Department; Albion, MI Department of Public Safety; homer, MI Police Department; Michigan State Police; Michigan Air National Guard; FBI Detroit Office; FBI Grand Rapids Office; Radio Comm, Inc (vendor)	Battle Creek, MI
14 February 2003	Illinois State Police	Springfield, IL

DATE	ATTENDEES	LOCATION
18 February 2003	U.S. Coast Guard	Cleveland, OH
24 February 2003	Cullman County, AL Emergency Management Agency; Madison County, AL Emergency Management Agency; Franklin County, AL Emergency Management Agency; Morgan County, AL Emergency Management Agency; Jefferson County, AL Emergency Management Agency; Dekalb County, AL Emergency Management Agency; Blount County, AL Emergency Management Agency; Cherokee County, AL Emergency Management Agency; City of Roanoke, AL Emergency Management Agency; Allcomm Wireless (vendor)	Alexandria, VA
28 February 2003	Prince William, VA Police Department; Prince William, VA Office of Information Technology; Price William, VA Office of Public Safety Comm; Manassas, VA Police Department; Virginia State Police; National Park Service – Manassas Battlefield Park; National Park Service – Prince William Forest Park; Quantico Fire Department; George Mason University	Prince William, VA
05–06 March 2003	Royal Canadian Mounted Police; U.S. Attorney Northern District of New York; U.S. Attorney Vermont; U.S. Border Patrol Buffalo, New York; U.S. Border Patrol Swanton, Vermont; U.S. Coast Guard; MAGLOCLEN, Pennsylvania State Police, New Hampshire State Police; Michigan State Police; Akwesasne Mohawk Police; St. Regis Mohawk Tribal Police; Syracuse, New York Police Department; Franklin County, New York DA's Office; New York State Police; BCI	Syracuse, NY
12 March 2003	Motorola	Alexandria, VA

DATE	ATTENDEES	LOCATION
19 March 2003	1st, 4th, 8th, 11th, 13th Judicial District, New Mexico Attorney's Office; Albuquerque, New Mexico Police Department; Belen Police Department; Bernalillo County Sheriff's Office; Bloomfield Police Department; Carrizozo Police Department; Cuba Police Department; Curry County Sheriff's Office; Dona Ana County Sheriff; Farmington Police Department; Grants Police Department; Harding County Sheriff; Hobbs Police Department; Las Cruces Police Department; Las Vegas Police Department; Lincoln County Sheriff; Los Lunas Police Department; McKinley County Sheriff; Roswell Police Department; San Juan County Sheriff; Santa Fe Police Department; Socorro Police Department; Sunland Park Municipal Police Department; Zuni Police Department; Albuquerque Open Space; Bernalillo County; Santa Fe County' Isleta Tribal Police Department; Santa Ana Tribal Police Department; Ramah/Navajo Department of Public Safety; Bureau of Alcohol, Tobacco and Firearms; Bureau of Indian Affairs; Bureau of Land Management; Department of Interior; New Mexico Board of Pharmacy; New Mexico Department of Agriculture; New Mexico Department of Health; New Mexico Department of Public Safety; New Mexico Livestock Board; New Mexico State Police; New Mexico State University; New Mexico Institute of Mining and Technology; New Mexico Taxation and Revenue Department; New Mexico Probation and Parole Investigation; Los Alamos National Laboratory; Sandia National Laboratory; Air Force Office of Special Investigation; Department of Defense office of IG; Transportation Security Administration; Bureau of Immigration and Customs Enforcement; Federal Bureau of Investigation; National Nuclear Security Administration; U.S. Border Patrol; U.S. Drug Enforcement Administration; U.S. Forest Service; U.S. Attorney's Office; U.S. Internal Revenue Service; U.S. Marshals Service; U.S. Secret Service	Albuquerque, NM

DATE	ATTENDEES	LOCATION
20 March 2003	Bahm, AL Police Department; Jefferson County Sheriff's Department; Birmingham Fire Department; Homewood Fire Department; Hoover Fire Department; Jefferson County Emergency Management Agency; Tarrant Fire Department; City of Birmingham; City of Hoover, AL; Jefferson County, AL; Allcomm Wireless	Birmingham, AL
03 April 2003	American Red Cross; American Medical Response, Inc; Baker College; Bon Selours Health Services; Botsford General Hospital; Chelsea, MI Community Hospital; Children's Hospital of Michigan; Communications Electronics, Inc.; Community EMS; Concord, MI EMS; Detroit, MI Emergency Management Department; Detroit, MI Health Department; Detroit, MI Fire Department; Detroit Medical Center; DownRiver Fire Chiefs; Essex-Windsor, Ontario EMS; Essex County Emergency Management; FBI; Garden City, MI Hospital; Henry Ford Hospital; Huron Valley Ambulance; Michigan Department of Community Health; Mercy Memorial Hospital; MFH; Monroe County, MI Health Department; Monroe County, MI Sheriff's Department; Michigan State Police Emergency Management Division; Michigan Department of Public Health; Division of Radiological Health; Oakwood Healthcare System; Saint John Detroit,MI Riverview Hospital; St. Joe's Ann Arbor, MI Hospital, St. John Hospital and Medical Center; St. John NorthEast Comm Hospital; St. Joseph Mercy Hospital; UM Hospitals and Health Centers; UM Medical School; University of Michigan; Wayne County Health Department; Wayne State University	Detroit, MI

DATE	ATTENDEES	LOCATION
07-10 April 2003	Abbotsford, BC Police Department; Bureau of Customs and Border Protection; Bureau of Immigration and Customs Enforcement; Bureau of Indian Affairs; Canada Citizenship and Immigration; Canada Customs; Canada Customs and Revenue Agency; Canadian Consulate General; Canadian Security Intelligence Service; Citizenship and Immigration Canada; Dakota Ojibway Police Service; Department of State; Drug Enforcement Administration; IC Police Operations; Investigations, Communication and Enforcement; Joint Task Force Six, USNORTHCOM; Kendall County, IL Sheriff; MAGLOCLEN; Maine State Police; Manitoba Finance and Taxation; Midwest HIDTA; National Drug Information Center; National Weapons Enforcement Support Team; New York State Police; North Dakota Bureau of Criminal Investigations; Ontario Ministry – Public Safety and Security; Ontario Provincial Police; Organized Crime Agency of British Columbia; Project NorthStar; Rocky Mountain Information Network; Royal Canadian Mounted Police; Solicitor General Canada; U.S. Attorney's Office – Montana, Vermont, Albuquerque, Eastern District of Michigan, North Dakota; U.S. Border Patrol; U.S. Coast Guard, U.S. Embassy – Department of homeland Security; U.S. Marshals Service, Western District of New York	Winnipeg, Manitoba
11 April 2003	U.S. State Department	Alexandria, VA
11 April 2003	George Mason University Police Department	Alexandria, VA
23 April 2003	Sturbridge, MA Fire Department; Sturbridge, MA Police Department; Town of Sturbridge	Sturbridge, MA
24 April 2003	Alabama EMA	Alexandria, VA

DATE	ATTENDEES	LOCATION
24 April 2003	New York State Police; Bergen County Sheriff's Department; Bergen County Department of Public Safety; Haverstraw Township, New York Police Department; Montvale, New Jersey Police Department; Rockland County, New York Sheriff's Office; Rockland County, New York office of Emergency Management; South Nyack, New York Police Department; Stony Point, New York Police Department; Town of Ramapo, New York Police Department	Orangeburg, NY
25 April 2003	Lynn, MA EMA; Saugus, MA EMA; Swampscott, MA EMA	Swampscott, MA
01 May 2003	Catalyst; Cumberland County, VA; Roanoke County, VA; City of Roanoke, VA; Hopewell, VA Police Department; Virginia Beach, VA; Harrisonburg-Rockingham, VA ECC; Orange County, VA E911; Eastern Shore of Virginia 911; Isle of Wright Emergency Communications; Manassas, VA City Police Department; Loudon County, VA; Loudon County, VA Sheriff's Office; Henrico County, VA Police Department; Chesterfield, VA Emergency Communications; MAST International	Virginia Beach, VA
06-08 May 2003	Grafton, MA Police Department; West Virginia Office of Emergency Management; W I Office of Justice Assist; AF Civil Emergency Support Agency; North Marianas Islands Government; DOE Albuquerque Non Proliferation Security Agency; RAND, Arlington, VA; Department of Public Safety Patuxent River, MD; AF Reserve Center; U.S. State Department; Federal Fire Service, Ft. Lee, VA; Sandia National Laboratory; Seattle, WA Fire Department; Department of Public Safety; Passaic County, NJ Office of Emergency Management; Boston, MA Police Department; Army INSCOM; Federal Fire Service; Virginia Beach, VA Fire Department; Virginia State Police; FBI Hazmat Response Unit; Battelle Memorial Institute	Quantico, VA
08 May 2003	Department of Defense	Alexandria, VA

DATE	ATTENDEES	LOCATION
12-13 May 2003	MA State Police; Barnstable, MA 911; Boston, MA Fire Department; Mashpee, MA Fire Department; Cattaraugus County, NY 911 Center; Halifax, NS Police Department	North Falmouth, MA
16 May 2003	Canadian Customs; Coast Guard Investigative Service; New York State Park Police; New York State Troopers Mobile Response Team; Royal Canadian Mounted Police; U.S. Border Patrol; Monroe County, NY Sheriff's Department; Orleans County, NY Sheriff's Department; Canadian Customs and Revenue; FBI; Rochester, NY Police Department; Wayne County, NY Sheriff's Office; New York State Office of Tax Enforcement; New York State Department of Tax and Finance; New York State Department of Environmental Conservation; Seneca County, NY Sheriff's Department; Toronto, Ontario Police Service; U.S. Customs; New York State Department of Motor Vehicle Investigations; U.S. Coast Guard Aux Air; Greece, NY Police Department; Department of Justice National Drug Intel Center; Irondequoit, NY Police Department	Rochester, NY
18 May 2003	IACP LEIM Conference	Denver, CO
21-22 May 2003	Solicitor General, Canada; OUSA - Northern District of NY, Vermont, New Mexico; FBI; U.S. Border Patrol; Royal Canadian Mounted Police; Canada Customs and Revenue Agency; Citizenship and Immigration Canada; Foreign Affairs and International Trade, Canada; Ontario Provincial Police	White Sulpher Springs, WV
28 May 2003	Department of Homeland Security; New York State Office for Technology; House Science Committee Staff	Rome, NY
29 May 2003	Raytheon	Alexandria, VA
30 May 2003	New York, NY Police Department	Rome, NY
10 June 2003	Federal Emergency Management Association	Alexandria, VA

DATE	ATTENDEES	LOCATION
10 June 2003	BICE/USBP; New Mexico State Police Department; White Sands Missile Range; FBI; Dona Ana County, NM Sheriff's Office; Dona Ana County, NM Emergency Management; Mesilla Valley, NM Regional Dispatch Authority	Las Cruces, NM
11 June 2003	Hobbs, NM Police Department; Lea County, NM Sheriff's Department; Lovington, NM Police Department; Tatum, NM Police Department; New Mexico State Police Department; Eunice, NM Police Department; Gaines County, NM Police Department	Hobbs, NM

4.12 PUBLICATIONS AND DOCUMENTS

During the course of the contract, several reports were completed that were approved and disseminated to the public safety community as either AGILE Reports or NLECTC-NE Reports. The reports are listed below.

Report Number	Title
AGILE TE-02-02	Guide to Radio Communications Interoperability Strategies and Products
AGILE TE-02-03	Metropolitan Interoperable Radio System—Alexandria Subsystem Description Document
AGILE TE-03-01	Multiband Antenna Test Results
NLECTC-NE 02-100	Technology Analysis and Assessment: McLean County, Illinois Consolidated Communications Radio System
NLECTC-NE 02-102	Concealed Weapons Detection (CWD) School Safety Testbed Project Final Report (Mar 02)
NLECTC-NE 02-103	Information and Technology Assessment: Methuen, MA Public Safety
NLECTC-NE 03-100	Information and Technology Assessment: Vermont Department of Corrections
NLECTC-NE 03-101	Metropolitan Interoperable Radio System (MIRS) Alexandria Site Description Document
NLECTC-NE 03-102	Technology Analysis & Assessment: Madison County, NY Public Safety Radio Systems

During the course of the contract, several technical memoranda were completed that were approved and disseminated to the public safety community as either an AGILE Technical Memorandum or an NLECTC-NE Technical Memorandum. The memoranda are listed below.

Memorandum No.	Title
AGILE TM-03-001	Gravity Mounted Tripod
AGILE TM-03-002	Blocking Issue with Audio Baseband Gateway Retransmission Devices
AGILE TM-03-003	Discussion of Fixed Interoperability Gateways and FCC Licensing
NLECTC-NE TM-03-001	Prince George County, VHF Narrowband Propagation Modeling and Analysis
NLECTC-NE TM-03-002	West Chester 500MHz UHF System Propagation Analysis
NLECTC-NE TM-03-005	Chowan County, VHF High-band, UHF and 800 MHz Propagation Modeling and Analysis
NLECTC-NE TM-03-007	VHF Dispatch Channel Propagation Evaluation
NLECTC-NE TM-03-008	UHF Fire Dispatch Channel Propagation Evaluation

5. CYBER CRIME INITIATIVES

The CyberCrime program involved a multi-faceted approach to supporting the law enforcement community, including further support for cybercrime coalitions, evaluation of candidate software tools, development of technical materials, and outreach activities. A key element of the program, the Cyber Science Laboratory Research Center (CSL RC), was opened at Air Force Research Laboratory (AFRL) on 27 September 2001.

5.1 JOINT COUNCIL ON INFORMATION AGE CRIME (JCIAC)

JCIAC was created in January 2001 and incorporated as a Section 501 (c)(3) nonprofit in February 2002 to improve and support public-private sector collaboration to prevent and respond to Information Age crime. From August 2002 to March 2003, JCIAC focused its efforts on assisting law enforcement, private security, government and academia in identifying and addressing key high-tech crime issues, through training and education, awareness and outreach, meetings and presentations.

Using the January 2001 JCIAC Summit list, the JCIAC formulated and assembled a database of Task Forces (public-private sector collaborative groups) focused on Information Age Crime. Each organization contains a template showing the following: a mission statement along with goals and objectives; the type of organization (for-profit, non-profit or public); the funding type; technologies utilized (lab and lab function/tools); information sharing methods (key affiliated organizations; contact information including persons involved in organization); and resources provided by each organization.

Throughout the contract, JCIAC supported the NLECTC-Northeast and other regional centers in public-private sector collaboration. JCIAC has attended and participated in numerous meetings,

continuously providing expertise and support to law enforcement, government, public-private sector collaboration, private security, and academia.

In presentations, checklists and guides, JCIAC distributed best practices and methodologies for the benefit of experts and practitioners in law enforcement, private security, government and academia. Where possible, JCIAC referred interested parties to or provided existing materials.

5.2 EVALUATION OF CANDIDATE SOFTWARE TOOLS

A number of software tools were evaluated with cyberscience applications. Activities included the following:

- Worked with U.S. Secret Service (USSS) to create accounts and gain access to the USSS E-library.

- Began the compilation of a comprehensive list of computer forensic-related tools to be incorporated into the CSL/RC Web Environment.

- Effort continued on the Hash Database Project. Various test cases were processed using varying combinations of operating systems and hardware. Investigation into the use of HashKeeper and NIST's hashing tool continued.

- Used Analysis Notebook to build a visualization chart for a money-laundering scenario. Set up and reorganized the original database of 7,668 documents from an Arizona money laundering case, to be able to import it into Analysis Notebook. From that case, a random sample was taken of approximately 1000 documents from the original database of 7,668 to build a sample database. The sample database will be used to run through IdentiFinder, which is an entity extraction software tool and Analysis Notebook, which is a visualization software tool.

- Tested a prototype of a link analysis tool called Group Detection Algorithm (GDA) with CMU’s sample data and built data set for testing.

- Evaluated StegoWatch by creating numerous test images, analyzed those images through StegoWatch, and located and downloaded seven different steganography software programs to embed images for testing StegoWatch.

- Found numerous papers and articles on the internet regarding steganography to include evaluation, as well as giving a description and link to those papers for the CSL website.

- Researched various pieces of hardware/software (self-booting Linux CDs, various write blockers, data recovery tools, computer forensic utilities, etc.) for the possibility of future purchase and evaluation. The purchase of several has been initiated.

- CSL personnel along with members of the JTTF, Western New York Regional Computer Forensics Laboratory, and the New York State Office of the Attorney General visited WetStone Technologies and received briefings on various WetStone tools for potential use.

- Evaluated First Responders Evidence Disk (FRED).

5.3 DEVELOPMENT OF TECHNICAL MATERIALS

500 copies of the CyberScience Laboratory's trifold were printed and distributed at the New York Electronic Crime Task Force (NYECTF) Quarterly meetings and other conferences.

Generated the Enterprise Protection Planning (EPP) document for Law Enforcement, which was sent to Rockland County PD. This plan utilizes the basic principles of EEP planning with a focus on a law enforcement enterprise. It recognizes that law enforcement organizations, like any enterprise, have assets requiring protection. Assets include human resources, physical assets and information technology. Each asset category was dissected and security countermeasures were identified that could be used to protect the various assets.

Started a rough draft of EPP handbook. This is the first phase of a comprehensive EEP planning document that can be used by law enforcement, commercial and governmental entities as a road map to assist them in protecting critical assets. It is designed as a primer for organizations with limited prior experience in this arena and seeks to encompass the totality of the security countermeasures discipline.

Started a Best Practice Guide for EPP. This effort is intended to be "training aid" for individuals involved in the EPP process. It will be tailored to the law enforcement environment with a focus on protecting law assets unique to the law enforcement community.

5.4 OUTREACH

The L-3 GSI team supported the *Discovery Channel* Young Scientist Challenge by creating a loose scenario for the challenge and e-mailing it to the head judge of the challenge, then created passwords in binary form and converted them into hexadecimal. These passwords were used in the challenge. The participants were required to take the binary form and convert it to hexadecimal in order to get the correct password to extract the hidden message.

Other outreach activities are listed below:

DATE	CONFERENCE	LOCATION
June 2003	USSS Washington Field Office	Washington DC
June 2003	Forensics Training Miami ECTF	Miami, Fl
June 2003	New York Electronic Crimes Task Force meeting	New York, NY
May 2003	Electronic Crimes Task Force Meeting—San Francisco	San Francisco, CA
May 2003	Critical Infrastructure Protection Conference	Arlington, VA
January 2003	Scientific Working Group on Digital Evidence (SWGDE)	Orlando, FL
January 2003	Technical Working Group for Courtroom Presentation of Digital Evidence	Orlando, FL

DATE	CONFERENCE	LOCATION
July 2003	Fusion 2+ Workshop	Utica, NY
December 2002	Introduction to Model-Based Process Improvement Overview (PIINES)	Rome, NY
December 2002	CSL Open House	Rome, NY

5.5 INTERN PROGRAM

Participation of interns in the CSL internship program has expanded to include high school students, ROTC, and the Young Scholars Program. Internships also have been awarded to two undergraduate college level individuals who will support the San Francisco Electronic Crimes Task Force.

6. INTEGRATED BORDER ENFORCEMENT TEAMS (IBET) TECHNOLOGY SUPPORT

Team personnel provided support to the Integrated Border Enforcement Teams (IBETs) in the areas of Radio Communications Interoperability, Geospation Technologies, and intelligence and sensors.

Support was provided to the Cross Border Crime Forum held in West Virginia on 20-22 May 2003. An informational booth was provided, as well as a live demonstration of the ACU-1000 communications switch as it is configured within the Central S. Lawrence Valley IBET region.

An in-depth review of IBET technical support activities was presented to the Canadian Solicitor General in Cornwall, Ontario on 28 February 2003.

A support meeting to integrate new technical partners into the IBET, including Defense Research and Development Canada (DRDC), Counter Drug Technology Assessment Center (CTAC), Technical Scientific Working Group (TSWG), and U.S. Army Ft. Belvoir's Night Vision Lab was conducted on 05-06 February 2003 in Massena, NY. The meeting, coordinated by the L-3 GSI team, resulted in obtaining significant international support for the IBET. DRDC committed to leverage the IBET as a testbed to evaluate emerging Canadian sensor technology along the border. CTAC committed to raising the prioritization on grant applications from state and local agencies where there was a connection to support an IBET. TSWG supported the meeting and captured the practitioners concerns and requirements for consideration as inputs for numerous R&D funding initiatives focused on border integrity.

An in-depth review of IBET technical support activities was presented to the Director of the National Institute of Justice in Washington, DC on 29 January 2003.

6.1 RADIO COMMUNICATIONS

The IBET Radio Communications Technology Working Group was facilitated and began looking at several actions to address interoperability needs of the IBET, including: (a) U.S. Department of Treasury providing excess equipment to RCMP to allow them to access the Treasury's radio system along the border; (b) planning to demonstrate a radio-to-radio link between Customs and RCMP using a patch at the National Law Enforcement Communications Center in Orlando; and (c) developing a concept for use of an ACU-1000 equivalent to meet requirements for secured and unsecured communications among IBET agencies. As part of the subsequent IBET Technology Support Group meeting, an ICRI was used to link RCMP and Customs. Several scenarios were exercised, including Customs radio to RCMP radio through each system's repeaters using encrypted communications. Audio quality was good although delays were noticeable. A Border Patrol radio was also linked to the ICRI but for unknown reasons was

breaking squelch in a cyclic pattern, and was disconnected from the ICRI. The demonstration was sufficiently successful that a field test was conducted. The Working Group's final recommendation was the purchase of ACU-1000s, which was done by the Royal Canadian Mounted Police (RCMP).

The L-3 GSI team worked with U.S. and Canadian border agencies to install the ACU-1000 purchased by the RCMP into a location in the Cornwall-Massena area. Communications support was provided to a Level 2 Operation conducted by the Cornwall/Massena IBET in October 2002. This was the first operational use of the ACU-1000, and the operation seizures included over $40,000, contraband cigarettes, and over 100 lbs of marijuana. Interoperability worked well with radio systems of the Royal Canadian Mounted Police, U. S. Customs Service, and U.S. Border Patrol being linked. Similar support was provided for a Level 3 Operation that was held in December 2002 with the Central St. Lawrence Valley IBET.

Other interoperability products were also demonstrated and evaluated as part of the IBET support. The Incident Commander's Radio Interface (ICRI) was demonstrated at Lacolle, Quebec and for the Detroit-Windsor IBET, and then utilized in support of a tactical operation run by the Superior IBET in February 2003. The operation was conducted on and around Drummond Island, MI in Lake Huron. The object of the operation was to stop contraband and illegal aliens from crossing the U.S. Canadian border in both directions.

Attended a meeting in Ray Brook, NY to discuss New York State Police's (NYSP) participation in IBETs located on the NY-Canadian border (Valleyfield, Cornwall-Massena, Thousand Islands, and Buffalo-Niagara). Based on this meeting, NYSP put up additional repeaters to be able to communicate on Federal interoperability channels with Federal agencies participating in IBET operations; U.S. Customs is providing the repeaters and antennas. In addition, NYSP purchased mobile and portable radios for troops stationed along the border to allow secure communications between NYSP and other IBET participants.

6.2 GEOSPATIAL DATA

The IBET Geographic Information Systems (GIS) Technology Working Group was facilitated which began looking at the mapping, imagery, intelligence and surveillance needs of the IBET in the four following areas:

a) Building Capacity
    1. Facilitate geospatial data and information sharing
    2. Make data available for intelligence analysis
    3. Connect with external mapping agencies for long term support
b) Planning and Analysis for Operations
    1. GIS analysis and image processing
    2. Mission planning
    3. Crime and pattern analysis
c) Preparing Officers for Operations
    1. Region familiarization
    2. Mission rehearsal
    3. Assessing operational effectiveness
d) Situation Awareness
    1. Asset and vehicle tracking
    2. Surveillance technologies
    3. Sensor monitoring
    4. Enhancing awareness in the command center

Activities included the development of the GIS Work Group's goals, outlined above, collecting requirements related to these goals, GIS data coordination and prototyping, and technology evaluations. Some highlights from the Working Group's activities are provided below.

The L-3 GSI team supported a Level 2 Operation for Central St. Lawrence Valley IBET on 04 – 05 December 2002. GIS data sets from multiple sources were integrated to provide a uniform picture of the operational area. GIS data was from RCMP, Ontario, and New York, and aerial imagery was provided by the City of Cornwall, RCMP, and New York. Satellite imagery from the US Geological Survey was also used. GIS was exercised in the Command Center to help provide situation awareness. Examples of enhanced situation awareness included the display of the regional features, Maniwaki and Valleyfield. Vehicle locations were also followed by voice transmissions on a map during the operation. One result of this activity was the graphic demonstration of the need for real-time vehicle tracking as the most important requirement for GIS in the operational environment.

An IBET GIS Working Group Technical Exchange Meeting was supported on 4 March 2003. Forty people attended representing fifteen agencies with an interest in mapping from both sides of the borders. Thirteen presentations were provided on cross border mapping coordination and geospatial technologies that can facilitate IBET operations. A technical obstacle was overcome as a direct outcome of the meeting, which enabled New York State to collect cross-border aerial imagery for homeland security. IBET will be able to benefit from this collection in the near future.

Other meetings were also attended in support of IBET. The RCMP Aerial Reconnaissance Unit provided a capabilities briefing in August of 2003, and a second technical meeting was held in October to help produce a product that better meets IBET needs. RCMP also provided a tour of their National Operations Centre for crisis management in October. ESRI (a GIS vendor), the Canadian Space Agency, Ontario Provincial Police, Ontario Provincial Police, and the US Border Patrol all provided a capability brief and technology demo for the IBET GIS Working Group. These meetings have helped IBET to get a better idea of their mapping, imagery, and sensor requirements, and to determine which resources are available to help address these needs.

7. FUTURE OUTLOOK

The vast majority of the L-3 GSI team's activities in support of the NLECTC-NE's efforts are ongoing under newly awarded contracts.